be seen in all stages of ulceration by light microscopy and by scanning and transmission electron microscopy. Sixty-five healthy *Octopus joubini* were given small incisions and immersed for 60 minutes in various concentrations of bacteria cultured from the ulcers, and *Vibrio alginolyticus* at 10^6 cfu/mℓ produced similar skin ulcers within two days. Penicillin, chloramphenicol, minocycline hydrochloride, and 10% nifurpirinol (Furanace®) were evaluated as treatment. Nifurpirinol was effective; of 28 *Octopus joubini* dipped each day for 10 minutes in 10 mg/ℓ nifurpirinol over an 82-day period, only 18% died, and 73% of the remainder showed nearly complete healing. Nifurpirinol was effective on *Octopus briareus* as well. This higher concentration healed the ulcers but killed 78% of the octopuses; lower doses should be used in the future. There was an apparent species-specific susceptibility to the disease because *Octopus maya* and *Octopus bimaculoides* in the same culture systems were disease-free. The suspected cause of ulceration was increased contact among crowded octopuses that resulted in skin abrasions which were invaded by opportunistic bacteria.

LARVAL DEVELOPMENT OF THE "GUTLESS" PROTOBRANCH BIVALVE *SOLEMYA REIDI* BERNARD 1980 (BIVALVIA: PROTOBRANCHIA). Richard Gustafson, Department of Biology, University of Victoria, British Columbia.

Development and morphogenesis of *Solemya reidi* was followed throughout the six-day lecithotrophic larval stage at 10°C using light and scanning electron microscopy. *S. reidi* is not gutless throughout its life.

THE BENTHIC ECOLOGY OF A GUTLESS PROTOBRANCH BIVALVE, *SOLEMYA REIDI*. Penelope A. Gee, Department of Biology, University of Victoria, British Columbia.

Solemya reidi, a recently described benthic protobranch bivalve from the northeastern Pacific Ocean, possesses neither a gut nor internal enzymatic apparatus. High densities of this animal appear limited to sediments below wood-fibre beds. An effort has been made to relate the animal's density and distribution to a number of environmental parameters. Current research incorporates recent information on the animal's possible modes of nutrition.

BROODING IN *TRANSENNELLA TANTILLA* (BIVALVIA: VENERIDAE). Alan R. Kabat, Department of Zoology and The Friday Harbor Laboratories, University of Wasington, Seattle.

The brooding of a small Pacific Coast bivalve, *Transennella tantilla* (Gould, 1852) is analyzed. This clam broods up to 170 embryos between the inner gill and the body wall. Within each brood mass, the embryos are individually encapsulated, and the whole mass shows a graded sequence of developmental stages, from youngest (dorsal/proximal) to oldest (ventral/distal). Most other brooding bivalves show synchrony of embryonic development within a brood mass. Direct development to a non-pelagic juvenile stage occurs and there is no planktonic veliger stage. The hatched juveniles leave the mother through her exhalent siphon.

The allometry of brooding is considered from a theoretical viewpoint and it is shown that reproductive effort (brood number and brood weight) increase in proportion to the square of adult size. It is concluded that the gill surface area acts as a morphological constraint on reproductive output.

The maternal feeding currents, by aerating the embryos, are potentially used for embryo respiration and excretion. In vitro culturing of the embryos was unsuccessful.

Since there is no planktonic larval stage, it is predicted that other agents are involved in the dispersal of juveniles and adults. These agents include external factors (birds, fish, seaweed rafting, storms, currents) and internal factors (byssus thread drifting), and must be responsible for the contemporary species range.

BIVALVE ASSEMBLAGES IN NORTON SOUND, ALASKA: SIZE STRUCTURE AND EFFECTS OF PREDATORS. Allan K. Fukuyama, Moss Landing Marine Laboratories, California.

The bivalves *Mya truncata, Macoma calcarea, Serripes groenlandicus,* and *Yoldia hyperborea* are characteristic animals of subtidal, soft sediments in northwestern Norton Sound, Alaska. Size class domination is exhibited with many small, recently settled animals, very few intermediate sizes, and a distinct adult population. It is believed that predation by seastars, especially *Asterias amurensis*, is responsible for the size classes seen. Gut content examinations of *A. amurensis* showed it to be an important predator on bivalves <10 mm. Once this initial predation is surpassed, refuges from seastars are attained. Laboratory studies and field observations revealed that *Y. hyperborea* and *S. groenlandicus* are able to use behavioral escape responses of burrowing and leaping, respectively, while *M. calcarea* and *M. truncata* use a depth refuge, in conjunction with a related size refuge in order to avoid predation by seastars. Once these bivalves reach about 40 mm, they become subjected to seasonal predation by walruses. *S. groenlandicus* is the preferred prey since it is a shallow burrower and populations of this species have been reduced. Consequently, walruses appear to be concentrating their feeding efforts now on populations of *M. truncata*.

ASPECTS OF THE DEVELOPMENTAL BIOLOGIES OF *OENOPOTA LEVIDENSIS* (CARPENTER, 1864) AND *OENOPOTA FIDICULA* (GOULD, 1849) (GASTROPODA: TURRIDAE). Ronald Shimek, Bamfield Marine Station, British Columbia, Canada.

Oenopota levidensis deposits egg capsules proportional to the size of the female, large females (1 > 20 mm) depositing up to 250 eggs per capsule. There are no nurse eggs. The capsules hatch 21–69 days later releasing veligers that swim actively for about one week. The planktotrophic veligers dévelop demersally for a further period of up to seven weeks. Total developmental time is from